

CLAIM PTO/SN 09/665,634/AK /4/15/05

What is claimed:

1. A cap operated retractable medical device combination comprising:

45 a long thin walled tubular outer body having a back end with an opening and a front end which incorporates a centered hub;

30 an elongated movable member closely fitting entirely within the outer body, the movable member having a back end with an opening and a front end and front portion wherein the front portion has a radially enlarged inner surface and an outer surface;

55 a retraction body having a laterally extending wall with an outwardly facing edge, releasably held at a forward position with respect to the movable member by means of the radially enlarged inner surface of the front portion of the movable member;

60 the movable member being held in position with the retraction body adjacent the hub of the outer body by means of a tight area created between the outer surface of the front portion of the movable member and the inside surface of the wall of the outer body near its front end;

* 65 a cap hinged at the back end of the outer body and selectively movable between an open position and a closed position relative to the opening at the back end of the outer body, said cap having a cam surface

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configured to engage the back end of the movable member inside the outer body and move it forward as the cap is moved to the closed position; and whereby closing the cap causes the movable member to move forward while the retraction body is restrained by the hub in the outer body thereby releasing the retraction body from the movable member.

2. The combination of claim 1 wherein the wall of the tubular outer body has a portion of the wall behind the front end which is thickened to create a stepped portion on its inner surface which cooperates with the outer surface of the front portion of the movable member to create said tight area whereby the movable member is held in a forward position.

3. The combination of claim 2 wherein the outer surface of the front portion of the movable member is radially enlarged relative to the wall of the movable member to cooperate with the stepped portion on the inner surface of the outer body to create the tight area which holds the movable member in a forward position.

4. The combination of claim 2 wherein a rear portion of the wall of the movable member has an inner surface which is stepped inwardly to form a constriction which will catch the retraction body when it retracts and prevent it from escaping from the movable member.

5. The combination of claim 1 wherein the retraction body carries a needle holder with a needle extended through the front of the outer body.

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6. The combination of claim 5 wherein the retraction body has a centrally located opening for securing said needle holder which can be installed from the front of the assembled device.

7. The combination of claim 6 wherein said centrally located opening is formed by a forwardly extending tubular wall which in cooperation with the hub serves to confine said biasing means between the hub and the retraction body.

8. The combination of claim 5 wherein said cap has an outer rim larger than the opening in the back of the outer body and an inner rim comprising two camming protrusions which are spaced apart and positioned to enter said opening when the cap is moved to the closed position.

9. The combination of claim 8 wherein said protrusions are oppositely positioned along the inner rim about half-way from the hinged connection.

10. A cap operated retractable medical device combination comprising:

an elongated outer body having a partially closed front, an open back and an intermediate wall portion connecting the front and back; wherein the intermediate wall portion has an inner surface that defines a hollow interior and an opening at the back;

a cap which is selectively positionable with respect to said opening between an open position which allows access to the hollow interior and a closed position which blocks said opening, said cap having a camming protrusion which moves through the opening when the cap is moving to the closed position;

an elongated movable member shorter than the outer body and contained therein, the movable member having a wall configured to define an external surface in close proximity to the inner surface of the wall of the outer

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- body, an internal surface which defines a cavity therein and an open back end which serves as a contact surface for the camming protrusion on said cap; and there is a front end portion of the movable member with radially enlarged inner and outer surfaces;
- 5 a retraction body releasably held by the movable member at the radially enlarged inner surface of the front end portion of the movable member;
- 10 the radially enlarged surface of the movable member being slidably held by a portion of the inner surface of the outer body at a location spaced behind the partially closed front of the outer body;
- 15 means for preventing forward movement of the retraction body and biasing means adapted to apply a retraction force to the retraction body; and
- 20 whereby the retraction body may be released from the movable member for retraction by forward movement of the movable member caused by positioning the cap into the closed position while the retraction body is restrained by said means for preventing forward movement.
- 25 11. The combination of claim 10 wherein the retraction body carries a needle holder with a needle extended through the partially closed front.

12. The combination of claim 11 wherein the partially closed front comprises a hub centered along the longitudinal axis of the device.

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13. The combination of claim 12 wherein the retraction
30 body has a laterally extending discoid wall having an outer
facing edge which is held by the radially enlarged inner
surface of the front end portion of the movable member.

14. The combination of claim 13 wherein the retraction
body has a centrally located opening for securing said needle
35 holder wherein said needle holder can be installed from the
front of the assembled device.

15. The combination of claim 14 wherein said centrally
located opening is formed by a forwardly extending tubular
wall which in cooperation with the hub serves to confine said
40 biasing means between the hub and the retraction body.

16. The combination of claim 15 wherein the biasing
means comprises a coil spring which closely circumscribes
the tubular wall of the retraction body thereby stabilizing the
retraction body as it retracts.

17. The combination of claim 10 wherein said cap is
45 hingedly connected at the back of the outer body to pivot at
the hinge between said open and said closed position thereby
positioning said protrusion to engage the contact surface on
the movable member to cause said forward movement of the
50 movable member when the cap is moved to the closed
position.

18. The combination of claim 17 wherein said cap has an
outer rim larger than the opening in the back of the outer
body and an inner rim comprising two camming protrusions
15 which are spaced apart and positioned to enter said opening
when the cap is moved to the closed position.

19. The combination of claim 18 wherein said protrusions
are oppositely positioned along the inner rim about half-way
from the hinged connection.

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20. A cap operated retractable medical device in combination comprising:
a tubular outer body having a front end portion, a back end portion and an open
back end;
a movable cap disposed at the back end portion of the tubular outer body, the
movable cap being movable from an open position to a closed position to close the
open back end of the tubular outer body;
a needle bearing retraction body disposed in the tubular outer body and
comprising a needle projecting outwardly from the front end portion; and
a movable member extending between the closed position and the retraction
body, the movable member disengaged from the movable cap in its open position;
whereby the action of closing the cap causes initial engagement between the cap
and the movable member, closes the open back end of the tubular outer body and
causes the movable member to release the needle bearing retraction body, retracting
the needle within the tubular outer body and retaining it therein.

21. The combination of claim 20 wherein the retraction body is retractably held
by the movable member operated by the action of closing the cap.

22. The combination of claim 20
wherein the movable cap is normally open
and movable from the normally open to the
closed position.

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23. The combination of claim 22 wherein the cap is hingedly supported at the back end of the tubular outer body for movement from the normally open to the closed position.

24. The combination of claim 20 wherein the needle bearing retraction body is retractably held by the movable member which moves in response to the action of closing said cap.

25. The combination of claim 24 wherein the movable member has a mouth having an inner surface which retractably holds the retraction body.

26. The combination of claim 25 wherein the needle bearing retraction body is retractably held within the mouth of the movable member by means of a sliding interference fit.

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27. The combination of claim 24 wherein the front end portion of the tubular outer body has a hub which serves to release the retraction body from the moveable member as the moveable member moves in response to the action of closing the cap.

28. The combination of claim 24 wherein the movable member has an outer surface being slidably held by means of the inner wall surface of the tubular outer body.

30. The combination of claim 24 wherein the movable member has an outer surface having a sliding interference fit with an interior surface portion of the front end portion of the tubular outer body which frictionally supports the moveable member with the exposed needle in an unretracted condition.

31. The combination of claim 24 wherein the front portion of the tubular outer body has a hub with an opening for receiving a forward portion of the unretracted retraction body and a stop for the retraction body when the movable member moves in response to the action of closing said cap.

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32. A cap operated retractable medical device, in combination comprising:
a hollow body having a front end portion and an open back end;
a pivotably connected cap associated with the hollow body which closes the
open back end of said body by the action of closing the cap;
a retractably mounted needle being releaseably held in a pre-retraction position
by a hollow movable member which is operated by the action of closing the cap to
release the needle; and
the needle being retracted into the hollow movable member by the action of
closing the cap, the needle being retained within said movable member thereby
preventing needle sticks.

34. The combination of claim 32 wherein the movable member is a tubular
member within the hollow body which is operated by the action of closing the cap.

35. The combination of claim 32 wherein the retractably mounted needle is
mounted in a retraction body releaseably held by the movable member.

36. The combination of claim 35 wherein the movable member is a tubular
member having a front end portion and an open back end.

37. The combination of claim 36
wherein the retraction body is a discoid
shaped member releaseably held in the front
end portion of the movable member.

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38. The combination of claim 37 wherein the discoid shaped member has an outer edge which is releaseably held by means of a sliding interference fit at the front end portion of the movable member.

39. The combination of claim 36 wherein the front end portion of the movable member is releaseably held by means of a sliding interference fit at the front end portion of the hollow body.

40. A cap operated retractable medical device combination comprising:

a tubular outer body having a back end having an opening and a front end portion;

a cap mounted at the back end of the outer body for movement between an open position and a closed position relative to the opening at the back end of the outer body;

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a movable member slidably positioned in the tubular outer body, the movable member being responsive to movement of the cap from its open to its closed position;

a retraction body associated retractably with one end of the movable member; and

whereby the retraction body is dissociated from the movable member and retained in the tubular outer body by the act of moving the cap to its closed position.

41. A method of operating a retractable medical device, comprising the steps of:

providing a tubular outer body having a front end containing a retraction mechanism with a retractable needle and an open back end having a closeable cap attached by a hinge to the outer body;

retracting the needle by the action of closing the cap; and

retaining the retracted needle within the tubular outer body.

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42. The method of claim 41 wherein the step of retracting the needle is performed by pressing the closeable cap against a movable member associated with the retractable needle.

43. The method of claim 42 wherein the retractable needle comprises a retraction body removably holding the needle, the retraction body being removably associated with the movable member and the step of pressing the closeable cap against the movable member includes the step of

dissociating the retraction body from the movable member.

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44. The method of claim 43 wherein the step of dissociating the retraction body from the movable member is accomplished by the steps of stopping the retraction body from moving forward while the movable member is moving forward in response to the step of pressing the closeable cap against the moveable member.

45. The method of claim 44 wherein the step of stopping the retraction body from moving forward while the movable member is moving forward is accomplished by the step of bringing the retraction body into contact with a structure in the front end of the tubular outer body.

46. The method of claim 44 wherein the step of stopping the retraction body from moving forward while the movable member is moving forward is accomplished by the step of slidingly separating an interface between the retraction body and the movable member.

47. In a medical device having a tubular outer body with an open end, a needle retraction body disposed opposite the open end, and a movable member slidable axially in the outer body, the improvement comprising a cap pivotably connected to the outer body to close the open end and thereby initiate retraction of a needle into the tubular outer body by operation of the retraction body.

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49. In a medical device having a tubular outer body with an open end, a needle retraction body disposed opposite the open end, and a movable member slidable axially in the outer body, the improvement comprising a cap hinged to the outer body to close the open end and thereby initiate retraction of a needle into the tubular outer body by operation of the retraction body.

50. In a medical device having a tubular outer body with an open end, a needle retraction body disposed opposite the open end, and a movable member slidable axially in the outer body, the improvement comprising a cap unitarily molded to the outer body to close the open end and thereby initiate retraction of a needle into the tubular outer body by operation of the retraction body.

51. The medical device of claim 47 wherein the movable member is disposed between the cap and the retraction body, the retraction body being releasable when the movable member is displaced by movement of the cap during closure of the open end of the tubular outer body.

52. The medical device of claim 47 wherein the medical device is a fluid collection device.

53. The medical device of claim 52 wherein the fluid collection device is a blood sampler.

54. In a blood sampler having a tubular outer body with an open end, a needle retraction body disposed opposite the open end, and a movable member slidable axially relative to the outer body, the improvement comprising an end closure for the tubular outer body, the end closure having an open position providing access to the hollow interior of the movable member, a blocking position with respect to the open end that

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initiates contact with the movable member and a closed position preventing access to the hollow interior of the movable member and initiating retraction of a needle into the tubular outer body by operation of the retraction body.

55. The blood sampler of claim 54 wherein the end closure is attached to the outer body to close the open end of the outer body and also initiate retraction of a needle into the outer body by operation of the retraction body.

56. The blood sampler of claim 55 wherein the end closure is attached by a hinge to the outer body to close the open end and thereby initiate retraction of a needle into the tubular outer body by operation of the retraction body.

57. The blood sampler of claim 54 wherein the end closure is attached to the outer body to close the open end and thereby initiate retraction of a needle into the tubular outer body by operation of the retraction body, the end closure and outer body being unitarily molded.

58. The blood sampler of claim 54 wherein the movable member is disposed between the end closure and the retraction body, the retraction body being releasable when the movable member is displaced by movement of the end closure during closure of the open end of the tubular outer body.

61. In a blood sampler having a tubular outer body with an open end, a needle/retraction body disposed opposite the open end, and a movable member slidable axially in the outer body, the improvement comprising an end obstruction attached to the tubular outer body having a position independent of the movable member, the end obstruction initially contacting the movable member to move the movable member forward until retraction of a needle into the tubular outer body by operation of the retraction body.

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62. In a blood sampler having a tubular outer body with an open end, a needle retraction body disposed opposite the open end, and a movable member slidable axially in the outer body, the improvement comprising a blocking member attached to the outer body adjacent its open end, the attached blocking member being selectively movable from a first position in which the blocking member does not traverse the open end to a second position in which the blocking member traverses the open end and also initiates retraction of a needle into the outer body by operation of the retraction body.

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